

Final Report JOINT FIRE SCIENCE PROGRAM

TITLE OF PROJECT: Dormant-Season Prescription Fires to Reduce Hazardous Fuel Loads on the South Carolina Coastal Plain: Establishing a Demonstration Area on a 40+ year Study

PROJECT LOCATION: Francis Marion National Forest, Jamestown, SC.

JFSP PROJECT NUMBER: 01B-3-1-03

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SUMMARY OF FINDINGS:

Frequent Burning will control midstory hardwoods.

Prior to treatment, plots were dominated by loblolly and longleaf pine with some pond pine in wetter areas. Control plots developed a midstory layer of hardwoods that has changed very little since 1970. All of the burn treatments have kept hardwoods from growing into the midstory, although there are a few taller than 2 m in the 4-year burn plots. Thus, if significant hardwoods are not present, burning even every 3 or 4 years will keep pine stands in this coastal plains region open enough for Red Cockaded woodpecker (RCW) habitat.

Burning does not affect Overstory Pine Longevity.

A major concern of managers is retention of large overstory pine for RCW. Pine basal area declined in most plots because of mortality from hurricane Hugo, but prescribed burning did not kill any overstory pines. Therefore, managers can apply prescribed burning for its many benefits without undue risk of losing the overstory pine component.

Even infrequent burning will control fuel buildup.

All burning treatments significantly reduced understory and ground fuel loads. The annual burn plots had the lowest fuel level, but even the 4 year burns plots had substantially less fuel than unburned controls. Thus, any of the treatments could be used to keep fuel loads down and reduce wildfire hazard to a reasonable level.

Burn Frequency affects understory composition and richness.

All burn treatments reduced understory woody cover, but there is some recovery between fires. Because of the longer return interval with 3 and 4 year burn cycles, woody cover from tree sprouts and shrubs dominates the understory on these plots. With annual or biennial burn intervals grasses and forbs become the dominant understory species, although wood species are

still present. The most understory species will occur on areas burned annually and decreases as burn interval increases.

Managers have options.

Burning every 3 or 4 years is sufficient to keep fuel loads down and reduce wildfire hazard. This is the only treatment needed to maintain stands with overstory pines, keep midstory hardwoods from developing, have some herbaceous species in the understory, and maintain habitat suitable for RCW. If other habitat, like grass dominated for special bird species is desired, a burn cycle of 1 or 2 years can be used to create these conditions.

PROJECT OVERVIEW: BACKGROUND

This coastal area, consisting of broad flat to gently rolling sandy marine deposits reaching up to 150 miles inland from the ocean, is one of the South's most populated regions. Historically much of the local area was covered by forests dominated by longleaf (*Pinus palustris* Mill.) The entire region was adapted to and dependent upon frequent low intensity fire. This frequent fire maintained relatively open stands of pine with a ground layer of grasses, herbs and small shrubs. The lack of a midstory layer to catch shed needles, accumulate fuel, or serve as a ladder to carry ground fires into the crowns of the trees meant catastrophic wildfires that killed vast acreages of overstory pines were very rare.

Uncontrolled wildfire following extensive logging in the early 1900's led to a policy of organizations attempting to quickly extinguish all fires. By 1950 the tools and organization to quickly extinguish most wildfires was in place. Even the coordinated efforts of a large fire fighting force, however, could not stop wildfires from occurring during significant droughts. This was especially obvious in the South where fuel accumulates rapidly and can reach high levels in 4 to 6 years. It was also recognized that fire had beneficial effects for forestry and the ecosystem when applied under controlled conditions. Thus, in the 1960's we entered an era of application of prescribed fire by trained professionals to obtain desired management objectives. The long-term effects of prescribed burning however remained unclear. This study was established to determine those long-term effects on fuels and composition when burning at different frequencies.

APPROACH

Researchers are examining responses to different burning frequencies consisting of: dormant season burns every 1, 2, 3, or 4 years with headfires, along with an unburned check treatment. A series of these treatment plots have been installed in a representative stand of naturally regenerated loblolly pine (*Pinus taeda*) and longleaf pine (*Pinus palustris*). The effect of these treatments on composition and structure of the plant community is being tracked by periodic measurements and surveys. Because of their location along a well traveled Forest Service road and proximity to a large and growing population, the plots are also being used to demonstrate the effects of prescribed burning to the public.

DELIVERABLES:

Proposed	Delivered
Annual Progress Reports	Progress Reports completed annually.
Pre and Post burn fuel and vegetation data collected and summarized.	<p>All data collected and summarized. Date was used for presentations:</p> <p>Outcalt, K.W. 2004. Long-term prescribed burning in the Southern US. November 18, 2004, Fire Science in Forestry Management Workshop in Charleston, SC. (Oral Presentation)</p> <p>Outcalt, K.W., and Wade, D.D. 2005. Response of a mixed longleaf and loblolly pine community to long-term dormant season prescribed burning. Poster presentation at Annual Meeting Ecological Society of America, August 7 – 12, 2005, Montreal, Canada. (Poster)</p> <p>Outcalt, K.W. 2006. Used as material in 1 day course I taught to 45 students from Forest Service, BLM, NPS, and BIA at Washington Institute, Seattle, WA. May 11, 2006 on Fire Ecology, Disturbance, and Burning in Southern Forests. (Oral Presentation)</p> <p>Published vegetation data in: Glitzenstein, J.S., Streng, D.R., and Wade, D.D. 2003. Fire Frequency Effects on Longleaf Pine Vegetation in South Carolina and Northeast Florida, USA. Natural Areas Journal 23(1):22-37.</p> <p>An additional publication is in preparation and will be submitted to an appropriate Journal.</p>
Erect signs on one replication of study along major road.	Signs placed on all plots along roads, which included all but 2 plots.
Erect permanent display board about study and prescribed burning.	Permanent display board constructed at road intersection adjacent to burn plots.
Create take home sheet for visitors to Display	Created and available at Display
Create web page describing area and study results	Web site created and updated as new information became available (http://www.srs.fs.usda.gov/fm)
Field day at Demo area	Conducted ½ day tour on November 19, 2004

	for researchers from federal agencies and universities and National Forest managers. Conducted ½ day tour on March 30, 2005 for researchers from Southern Research Station and State Forester Representatives.
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PRODUCTS ON CD:

Handout front and back
Poster front and back sections
Picture of poster
Pdf of NAJ pub.
PDF of ESA abstract